

## Appendix B: Industrial Sources of Mercury and Applicable Mercury-Specific Regulations

<i>Source</i>	<i># Fac. In Gl*</i>	<i>Origin/uses Of Mercury</i>	<i>Air Releases **</i>	<i>Water Discharges ***</i>	<i>Waste Management****</i>	<i>Comments</i>
<b>MERCURY PRODUCTION</b>						
<b>Primary Hg Production</b>		Hg no longer produced from Hg ore; primary Hg recovered as by-product from gold ores.	NESHAPS: Hg air emissions shall not exceed 2300 grams Hg/24hrs for mercury ore processing facilities (40CFR61.52)	Hg effluent limits for primary precious metals and Hg subcategory (40CFR 421.250) and mercury ore subcategory (40CFR440.40)	Solid wastes from extraction, beneficiation, and processing of ores exempt from RCRA hazardous waste regulations under Bevill amendment.	Mining facilities do not report chemical releases under TRI.
<b>Secondary Hg Production</b>	PA--2 IL--1 NY--1	Recycling/recovery of Hg containing products (e.g. dental amalgams, batteries); industrial waste and scrap (e.g. instrument and electrical manufacturing, waste, sludges from research labs).	Designated major source category of HAP emissions (CAA§112(c)).	Hg effluent limits for secondary Hg subcategory (40CFR421.200)--NSPS, PSNS based on amount of Hg produced or processed.		In-house Hg reclamation also occurs at industrial plants.  MN: drafting management standards for facilities recycling hazardous wastes. Hg refining plants in NY, PA, IL. MN also has three lamp recycling facilities.
<b>Key:</b> Hg - Mercury, CAA - Clean Air Act, NESHAPS - National Emissions Standards for Hazardous Air Pollutants, BIF - boilers and industrial furnaces, TRI - Toxic Release Inventory, MSW - municipal solid waste, HAP - hazardous air pollutant, MACT - maximum achievable control technology						
<b>Note: This table shows the significant sources of Hg releases by source category, and how those releases are currently regulated. Appendix A includes five categories of mercury sources: (1) Mercury Production, (2) Use as a Manufacturing Input, (3) Waste Disposal, (4) Release as a By-Product of Manufacturing, (5) Release as a By-Product of Electrical Generation. An asterisk (*) indicates that additional information appears on the last page.</b>						
Hg compound production	NY--3 OH--1 PA--1	Hg compounds include mercuric oxide, mercuric chloride, mercuric & mercurous sulfate, mercurous nitrate, organic Hg salt, thimersol				Many mercury compounds are imported.

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MERCURY USE IN MANUFACTURING*****						
Chemical And Allied Products						
Chlorine/Caustic Soda Manufacture (mercury cell chlor-alkali process)	WI--1 OH--1	Used as a catalyst in mercury cell process at chlor-alkali plants, which manufacture chlorine and sodium hydroxide. Hg cell process accounted for 14% of 1992 US chlorine production.	Hg emissions cannot exceed 2300g /24hrs; prescribed stack sampling methods required, and approved practices to meet specified ventilation emissions. (CAA (40CFR61, NESHAPS))	Existing Sources: BAT, BPT Hg effluent limits New Sources: NSPS, PSNS  No pretreatment standards for existing sources using mercury cell process (40CFR415.60)	Industry Specific: K071 and K106 are chlor-alkali wastes listed specifically for Hg. Land disposal restrictions for chlor-alkali process wastes effective May 1993	Largest single use of Hg in US  Impact of land disposal restrictions: some facilities are building mercury recovery plants; others are shipping wastes to Canada  Many Hg cell plants have changed to diaphragm cell process
Laboratory Uses		Used in instruments as reagent, catalyst, indicator, and for calibration, sealing, and radioactive diagnosis		No restriction --POTWs may develop public education campaigns for labs		Use declined from 32 metric tons in 1990 to 10 metric tons in 1991.
Paint		Mercury compounds used to control microbial growth in latex paint cans; prevent mildew growth on painted surfaces; anti-fouling agent in maritime paint			P092 - Phenylmercuric acetate (Hg compound used in paints) is an acute RCRA waste	• All registrations for mercury biocides used in paint banned or voluntarily canceled by registrant • Hg in paints expected to continue declining as existing supplies depleted. Paint on buildings is demolition waste (not RCRA)
Other Chemical and Allied Products		(see Table 5 and Appendix B for mercury- containing products.)				
Chemical And Allied Products						
Pesticides		Mercury compounds used as pesticides, biocides, fungicides		Process wastewater from manufacture of metallo-organic pesticides w/active ingredient containing Hg prohibited, subject to variances approved by EPA (40CFR455.30)		Voluntary cancellation of last two mercury-containing fungicides announced in November 1993

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<b>Electrical And Electronic Uses</b>						
<b>Electric Lamps</b>		<p><b>Use:</b> electrical conductor Hg emitted when lamps break</p> <p><b>Products:</b> High intensity lamps: mercury vapor lamps (used in motion picture production, photography, heat therapy); metal halide lamps; high pressure sodium lamps; incandescent lamp filaments, fluorescent lights</p>		Waste streams from fluorescent bulb manufacturing exempted from pretreatment regulations (for all chemicals)	Hg levels in some products meet RCRA or state hazardous waste definition and require special management and disposal	<p>Second largest source of mercury in MSW</p> <p>Fluorescent bulbs are promoted for energy conservation, but considered hazardous waste due to Hg levels; In 1999, EPA included mercury-containing lamps the in universal waste rule.</p> <p>MN has three lamp recycling facilities.</p>
<b>Wiring Devices &amp; Switches</b>		<p>Hg encased in metal is used as conductor to close electrical circuit</p> <p><b>Products:</b> thermostats, Hg cells in smoke detectors, mercury arc rectifiers, silent switches, tilt switches, relays, cathode tubes used for radios, radar, &amp; telecommunications equipment, electric toys</p>		No pretreatment limits for switchgear wastestreams (for any chemicals)		<p>Components found in a wide variety of equipment with electrical parts (e.g. white goods)</p> <p>These are considered hazardous wastes under RCRA.</p>
<b>Battery Manufacturing</b>		<p>(1) Used as anode or electrolyte to prevent corrosion and hydrogen release; extends shelf-life; improves performance in extreme temperatures. Products: alkaline batteries. (2) used as cathode in Hg oxide batteries.</p> <p><b>Products:</b> mercuric oxide (Hg zinc) button batteries, silver oxide, zinc-air, carbon zinc batteries, mercuric oxide cannister batteries. Hg leaches from corrosion in landfill; volatilizes during combustion</p>		<p>Hg effluent limitations for LeClanche subcategory (zinc anode batteries w/acid electrolyte) (40CFR461.40); NSPS, PSNS, PSES based on mg/kg cell produced for specified operations only; no discharge allowed from nonspecified operations</p> <p>Hg effluent limits for zinc subcategory (40CFR461.70) - BPT,</p>		<p>Batteries are largest source of Hg in MSW incinerators.</p> <p>In 1996, Congress passed the Mercury-Containing and Rechargeable Battery Management Act which phases out the use of mercury in batteries sold in the U.S. The sole exception are button-cell batteries whose mercury content is limited.</p>

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				BAT, NSPS, PSES, PSNS specified for various processes		
Instruments And Related Products						
Measuring & Control Instruments		Use: Hg used to measure or control reactions and equipment functions; Products: thermometers (primary use), pressure sensing devices (barometers, manometers), navigational equipment, seals, valves; medical/ scientific instruments: Hg emissions occur during cleaning and refilling, and from instruments in municipal solid waste	None	None		Digital thermometers are replacing Hg thermometers.  Hg thermometers banned in Sweden.  MN has special management and disposal restrictions on thermostats.

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<b>Dental Equipment &amp; Supplies</b>		<b>Uses:</b> forms alloys; chemically binds compounds together to form stable restorative material (amalgam is an alloy) <b>Products:</b> dental amalgam -- fillings for teeth, other dental equipment and supplies.	None	No specific pretreatment regulations --POTWs may develop education programs for dental offices		Dental amalgams may be a major source of elemental mercury vapor exposure to the general population. Dental amalgam in waste water contributes to POTW Hg levels; may contribute to mercury emissions in crematories.
<b>NOTE:</b> For product-specific information, please see Appendix B. Mercury has several thousand applications. Not all products and uses are specifically listed.						
<b>PRODUCT DISPOSAL - INCINERATION AND LAND DISPOSAL</b>						
<b>Municipal Waste Incineration</b>  (under CAA, fuel feed stream must be >30% municipal waste)		Hg is present in solid waste (batteries, electric lighting, etc.) - Hg emitted when waste is burned at high temperatures.	EPA has established MACT standards for major stationary sources. Rule compliance date is 12/2000.  MN - proposed waste combustion rules including emissions limits; new incinerator permits with Hg limits will require air monitoring systems and periodic stack testing.	N/A	MSW ash is considered hazardous waste if it exceeds RCRA toxicity levels. Supreme Court decision ( <i>Chicago v. EDF</i> , March 1994)	Municipal solid waste includes waste generated from residential, commercial, and institutional sources; equipment installed to trap fly ash and acid rain gases do not control Hg emissions  MN: Hg must be removed from products before disposal. OH: Considering installing Hg emission control equipment and separating Hg containing products; IL: Incinerator technology based on consideration of specific pollutants.
<b>Commercial/Industrial Waste Incinerators</b>		Hg present in wastes: batteries, lighting, etc.	EPA will issue proposed rules by 12/2000, and final rules by 12/2001 in accordance with CAA§129(a)(4).	N/A		

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<b>Sewage Sludge Driers &amp; Incinerators</b>	NY--33 PA--21 MI--19	Hg in sludge from wastewater treatment plants.	CAA - Hg emissions limit = 3200g/24hrs; annual monitoring and reporting if Hg emissions exceed 1600 g/24hrs; prescribed emissions testing procedure or procedures for sludge to demonstrate compliance (40CFR61.52, NESHAPS); Listed as source category for HAP emissions limits (CAA §112(c)(1))	(see wastewater treatment)		EPA is considering a revised rule.
<b>Wastewater Treatment</b>		Hg present in wastewater entering facility	No existing standards; not listed as category of HAP sources.	Mercury is eligible for removal credits - POTWs may request removal credits against facility pretreatment limits, as long as POTW meets sludge concentration limits	Sludges for land application or surface disposal must meet specific concentration requirements for agricultural land, forest land, public contact sites, home garden application or landfills  Hg concentration limits in sludge: 57 mg/kg limit for land application of sludge (40CFR503)	EPA will conduct studies to characterize HAP emissions from industries discharging to POTWs  Hazardous waste incinerators may test Hg content in sludge in lieu of emissions testing requirements.  Western Lake Superior Sanitary District (WLSSD) in Duluth, MN has active pollution prevention program  MI - POTWs must have waste minimization plans

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<b>Hazardous Waste Incinerators</b>	IL--1		<p>No uniform emissions standards; Hg limits depend on individual permits; facilities shielded from regulatory changes until permit expires (CFR 264.344)</p> <p>Waste analysis required to determine Hg concentrations unless incinerator has documentation of no Hg presence (40CFR265.341)</p> <p>Rule expected in 1999.</p>		Residues must meet LDR specifications	<p>EPA is revising draft hazardous waste combustion rules based on MACT standards</p> <p>Cement kilns also burn hazardous waste</p>
<b>Medical Waste Incinerators</b>		Hg in wastes generated from hospitals, clinics, labs, etc.	<p>In 1997, EPA set mercury emissions limits based on MACT standards for new and existing facilities. Rule Comply date is 9/2002..</p> <p>WI - incinerators with capacity &gt;5 tons/day must be tested for Hg during first 90 day period and following year</p>			

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<b>Landfills</b>		Mercury in products in the municipal waste stream, especially those subject to breakage such as thermostats, thermometers, and fluorescent lamps.	Under CAA (§112(d)) EPA will issue mercury emission standards for municipal solid waste landfills by 11/2000. Regulations will be based on MACT standards.	Monitor for Hg in groundwater; leachate testing requirements	<p>Subtitle D (non-hazardous) landfills: leachate cannot exceed 0.2mg/l Hg;</p> <p>Subtitle C (hazardous waste) landfills: disposal prohibited unless waste undergoes prescribed treatment to reduce Hg to regulated levels</p> <p>Determine Hg concentrations if food chain crops are grown - Hg cannot be transferred to food chain portion of crop</p>	<p>MN - studying Hg content of landfill gas and leachate. IL - Hg components must be removed from discarded white goods (e.g. appliances) before disposal</p> <p>MN: Hg must be removed from products before disposal.</p>
<b>Ash disposal facilities</b>		Mercury in incinerator ash	permit specific			
<b>Auto salvage/ scrap yards</b>		Automobile components have Hg, some automobiles used for illegal disposal; Hg released from crushing switches			MN monitors mercury levels	MN: developing best management practices for yard operators
<b>Crematories</b>		Hg in dental fillings volatilizes during cremation	Crematorium and pathological unit rules will be proposed 11/1999, as required by CAA §129.			
<b>Hospitals, Dentists</b>		Mercury in waste streams (water and solid waste)		No pretreatment regs		<p>IL: P<sup>2</sup> Bureau gives guidance on Hg disposal</p> <p>MN: WLSSD has a brochure for dentists</p> <p>OH: Community volunteer efforts address Hg in waste</p>



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<b>MERCURY AS A BY-PRODUCT OF MANUFACTURING PROCESSES</b>						
<b>Carbon Black Production</b>	MI--1 OH--1	Hg present in oil feedstock		No Hg limits; but discharge of process waste water prohibited except to POTWs. 40CFR458		
<b>Coke Production</b>	IL--3 IN--3 MI--1 NY--1 OH--3, PA--3	Hg is By-product present in coal used as feedstock for coke oven batteries (primary feedstock for iron and coal industry)				
<b>Petroleum Refining</b>		Hg present in petroleum crude		No specific Hg limits.		
<b>Lime Manufacturing</b>	IL--1 OH--1 PA--1	Hg present as impurity in processed stone and from fuel used to heat kilns				
<b>Portland Cement Manufacturing</b>		Hg present in ore and minerals used as raw materials; Hg in fossil fuels used in cement kilns	EPA issues proposed rules in 3/98.  Feed rate screening limits for mercury specified under interim standards for burners or industrial furnaces (40CFR266.103 and 266.106)			Cement kiln dust exempt from RCRA hazardous waste definition.  Cement industry is increasing its use of municipal, industrial, and hazardous wastes for kiln firing to replace fossil fuel use (for energy conservation); EPA is revising draft hazardous waste combustion rules
<b>Phosphate-based fertilizer factories</b>		Hg is trace element in rock phosphate				
<b>Primary Smelting &amp; Refining of Copper</b>	MI--1	Copper recovered from sulfide ore that contains Hg		Hg effluent limits for copper, lead, zinc, gold, silver ores subcategory (40 CFR 440.100)		Residues exempted from RCRA under Bevill exclusion

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<b>Primary Smelting &amp; Refining of Nonferrous Metals, Except Copper &amp; Aluminum</b>		Hg present in almost all minerals; lead recovered from sulfide ore that contains Hg; zinc smelting process generates Hg emissions	No existing regulations for mercury  Many mining facilities are listed as source categories for HAPS	Hg effluent limitations for: primary antimony subcategory (nonferrous metals category). (40CFR421.140); copper, lead, zinc, gold, silver, and molybdenum ores (40CFR440.100), and platinum ores subcategory (440.110)		Residues exempted from RCRA under Bevill exclusion
<b>MERCURY RELEASED AS A BY-PRODUCT IN POWER GENERATION AND HEATING</b>						
<b>Electric Power Generation (Utility Boilers)</b>		Hg present in coal, oil, natural gas, or wood used in electric utility steam generating units - emitted as trace contaminant when volatilized at high temperatures.	No current Hg emissions limits under CAA. CAA 112(n)(1)(A) Utility Study Report to Congress (1998) analyzed the public health hazards from utilities; EPA may promulgate regulations based on study results; utilities exempted from list of sources accounting for 90% of Hg emissions that will require MACT standards (§112(c)(6))	No detectable Hg allowed in discharge	Residues exempt from RCRA under Bevill exclusion	Coal has highest Hg content of fossil fuels. 80% of energy consumption in utility boilers is from coal combustion; 95% of coal is bituminous and subbituminous coal.
<b>Commercial &amp; Industrial Boilers</b>		Hg present in fuels	EPA will issue proposed rules 12/2000, and final rules 12/2001.			
<b>Residential Boilers and Wood Stoves</b>		Hg present in fuels				

Notes:

Source categories used to identify manufacturing uses of mercury follow Bureau of Mines categories, which track U.S. industrial consumption of refined Hg metal.

Mercury releases to air, water and land are reported by manufacturing firms that meet TRI threshold requirements. Manufacturing facilities (SIC codes 20-39) that have 10 or more full time employees and manufacture/process 25,000 pounds of a listed chemical or otherwise use 10,000 pounds of a listed chemical must report chemical release information in TRI.

\* "# FAC. IN GL" = number of facilities in Great Lakes States.

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Source: National Emissions Inventory of Mercury and Mercury Compounds: Interim Final Report, USEPA, 12/93.						
<p><b>** Air emissions:</b> EPA must list source categories that account for 90% of aggregate Hg emissions by 1995, excluding electric utilities. Sources will be subject to MACT standards within 10 years (§112(c)(6)). EPA has also published a list of major categories and subcategories of sources that emit hazardous air pollutants (including mercury and compounds). Any stationary source emitting more than 10 tons per year of a listed substance or 25 tons per year of any combination of substances will be subject to MACT standards. Major air toxics emitters will require permits.</p>						
<p><b>*** Water discharge:</b> BAT=best available control technology, BPT=best practicable control technology, NSPS=new source performance standards, PSNS=pretreatment standards for new sources, PSES=pretreatment standards for existing sources. States may impose more stringent permit limits to meet water quality standards for mercury (standards vary by state). Facilities must notify POTW of hazardous substances discharged which are not covered by pretreatment standards.</p>						
<p><b>**** Waste management:</b> Mercury is a listed and characteristic waste under RCRA. Any source listed here may be generating D009, the RCRA hazardous waste code that identifies wastes characteristic for mercury. Other RCRA waste codes that identify mercury include U151 (mercury), K071 and K106 (listed for mercury) , F039 (listed for multiple sources), P065 and P092 (mercury compounds). All mercury-containing wastes have land disposal restrictions. Specified treatment for mercury-containing wastes is incineration or thermal processing (40CFR 268.42).</p>						

### **Appendix C: Regulations on Products that Contain Mercury**

*Note: This table highlights regulations that affect the most common mercury-containing products. It is not a comprehensive list of all products that may contain mercury. The "Comments" section includes general information that expands on the regulatory information.*

<i>Product/Use</i>	<i>Role of Mercury</i>	<i>Regulations/Programs on Mercury Products</i>	<i>Fed/State Regulation</i>	<i>Comments</i>
<b>Chemical and Allied Products</b>				
<b>Agricultural Products</b>	Mercury compounds used as pesticides, bactericides, disinfectants, fungicide	Restricted and/or banned under FIFRA	Federal	
<b>Turf Products</b>	Pesticide	Calo-chlor and calo-gran, the last mercury-based pesticides registered for use in U.S. voluntarily canceled by manufacturer (Grace Sierra Crop Protection) in November 1993	Federal	Approximately 21,000 pounds used annually on golf course turf and greens to control fungi Pink Snow Mold and Grey Snow Mold; manufacturer may sell and distribute products labeled for release or shipment before 6/93 until 6/94: retailers may sell products until stocks exhausted; users may use products until stocks depleted.
<b>Paint</b>	Fungicide	Prohibits use of mercury in fungicides	MN	
	Mercury compounds used as biocide to control microbial growth in paint cans and prevent mildew on painted surfaces	Registrations for mercury compounds in indoor and outdoor latex paint banned or canceled (1990, 1991)	Federal	Manufacturers may use up existing stocks
		Anti-fouling paints for marine use banned in 1972	Federal	Cancellation of biocide registrations has reduced Hg consumption in paint, and paint residue in municipal solid waste; paint cans w/mercury residue are still discarded
		No Hg deliberately introduced into paint intended for use in MN (except in art supplies)	MN	
<b>Pigment, Dyes</b>	Coloring (maroon, red, orange) primarily for plastics	Cadmium-mercury pigments no longer manufactured in U.S. (domestic production ceased in 1988); may still be imported	Federal	Many states have laws that phase out metals in pigments
		No Hg deliberately introduced into pigments and dyes intended for use in MN (except in art supplies)	MN	
<b>Cosmetics</b>	Preservative, antimicrobial	Limited to eye area cosmetics or ointments with concentration <65 ppm (21CFR700.13)	Federal	
<b>Pharmaceuticals</b>	Used in antiseptics, ointments, diuretics	Misbranded drug laws - list quantity of mercury in product	IL, IN, NY, OH, PA	
		Yellow mercuric oxide is not generally recognized as safe and effective, or is misbranded for over the	Federal	

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Product/Use	Role of Mercury	Regulations/Programs on Mercury Products	Fed/State Regulation	Comments
		counter use		
Poisons		Restrictions on sale of mercury and mercury compounds	OH	
		Levels established for Hg products to be considered poisons	PA	
Catalysts	Hg used as catalysts for production of vinyl chloride monomers and urethane foams, as well as other products			
Packaging		Restrictions on merc contains intentionally introduced Hg content in packaging and packaging components; no products may be sold in packaging that contains intentionally introduced mercury.	FL, IL, MN, NJ, NY, WI	Implementation dates vary by state, and include general exceptions if no feasible alternatives exist; Pennsylvania is considering bill to regulate toxic materials in packaging
Special Paper Coatings	Mercury bromide and mercury acetic acid used in specialized paper and film with cathode ray tubes			Manufacturers plan to phase out use of mercury in coating
Explosives	Mercury fulminate is detonator	Explosives containing mercury are Class A, maximum hazards	MN, WI	In the last 20 years, only the military has used mercury explosives
Fireworks	Catalyst/explosive	Permits required for fireworks with mercury Fireworks containing mercury are prohibited.	MN MI, NJ	
Livestock and Poultry Remedies		List percentage of mercury on remedy	MI	
<b>Electrical and Electronic Uses</b>				
<b>Electric Lighting</b>				Electric lighting products are second largest component of municipal solid waste (after batteries)
Fluorescent Lamps (low pressure)	Mercury vapor fluoresces at UV wavelength	Encouraged as replacement for incandescent bulbs for energy conservation (see 10CFR450.31 - energy conservation measures). Included in the Universal Waste Rule.	Federal	Fluorescent lights are largest component of electric lighting discards in municipal solid waste; used bulbs considered hazardous waste because high levels of mercury exceed RCRA toxicity
		Lamps in state-owned buildings must be recycled. Viewed as by-product that can be recycled, and exempt from RCRA	MN OH	characteristic limit (.2 mg/l in leachate)
		Lamps sold to managers of industrial, commercial,	MN	

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		office, or multi-unit buildings must be labeled; building contractors must specify mercury management plans for removed lamps Lamps containing mercury must be labeled.	VT	
<b>Mercury Vapor Lamps</b>	Facilitates light production by electric arc	Encouraged for energy conservation (see 10CFR450.31 - energy conservation measures) Included in the Universal Waste Rule. Lamps must be self-extinguishing or have protective shield; efficiency standards in public areas (theaters, gyms) Mercury must be removed before disposal; lamp sellers and contractors responsible for public education about mercury management requirements; limits on production and distribution of lamps Lamps containing mercury must be labeled.	Federal  NY  MN	
<b>High Intensity Lamps</b>		Included in the Universal Waste Rule. Lamps sold to managers of industrial, commercial, offices, or multi-unit buildings must be labeled; building contractors must specify mercury management plans for removed lamps Lamps containing mercury must be labeled.	Federal MN	Used for outdoor lighting; mercury lamps are more efficient and brighter than other outdoor lights
<b>Metal Halide Lamps</b>		Included in the Universal Waste Rule.  Lamps containing mercury must be labeled.	VT Federal	Encouraged for energy conservation (see 10CFR450.31- energy conservation measures)
<b>Incandescent Lamp Filaments</b>	Hg used as continuous electrical contact in tungsten bar sintering	Included in the Universal Waste Rule.  Lamps containing mercury must be labeled.	VT Federal	
<b>Wiring Devices and Switches</b>				
<b>Thermostats</b>	Temperature measurement	Mercury must be removed for recycling or recovery before disposal; manufacturers must provide information and incentives to ensure recycling or proper management; heating, ventilating and air-conditioning (HVAC) dealers required to properly manage or recycle used mercury thermostats (MN St 115A.93, 115A.9561, 115.932) Products containing Hg must be labeled, including disposal restrictions	MN  MN	Digital thermostats are replacing mercury thermostats; long lag time before old Hg thermostats discarded  MN has pilot program for HVAC dealers to recycle mercury containing thermostats by returning them to

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				HVAC wholesaler who, in turn, returns them to Honeywell for recycling/reclaiming
<b>White Goods</b>	Mercury components (e.g., switches) may be included in large appliances (e.g., refrigerators, air conditioners, etc.)	Mercury components must be removed prior to disposal	MN, IL	
		Hg in repaired or replaced items must be reused or recycled	MN	
<b>Toys</b>		Ban on toys with Hg; fines imposed for retail sales	MN, WI	
<b>Electric Wall Switches</b>		Products containing Hg must be labeled, including disposal restrictions	MN	
<b>Electrical Components</b>	May be included in any electrical machinery (e.g., mining, automotive, and industrial equipment, smoke detectors, etc.)	Limits on mercury use in mining equipment	PA	
		Products containing mercury must be labeled, including disposal restrictions	MN	
<b><i>Batteries</i></b>				
<b>General Mercury Containing Batteries</b>		Batteries included in universal waste rule to ease RCRA restrictions on hazardous waste management and divert waste from MSW landfills; states may set up special collection programs not subject to storage, transportation, and permitting requirements of RCRA 1996 Battery Management Act bans all mercury-containing batteries in the U.S., except for button-cells batteries.	Federal	Batteries were largest source of Hg in municipal solid waste. Many states have banned mercury in batteries; manufacturers have reduced mercury use by over 90% since 1988.
		Deposit/refund system will begin in 1998: purchasers return used mercury batteries to retailer or approved collection facility	MI	
		Task force on storage, transport, disposal, recycling	IL	Industry groups have developed uniform voluntary industry labeling standards for lead and cadmium batteries
<b>Alkaline Batteries</b>	Prevents corrosion and hydrogen release, extends shelf life; improves	Hg concentrations <.025% by weight	MN, NY	Battery manufacturers have eliminated mercury in alkaline batteries, except button cells and reusable batteries.

### **Appendix C: Regulations on Products that Contain Mercury**

*Note: This table highlights regulations that affect the most common mercury-containing products. It is not a comprehensive list of all products that may contain mercury. The "Comments" section includes general information that expands on the regulatory information.*

<b>Product/Use</b>	<b>Role of Mercury</b>	<b>Regulations/Programs on Mercury Products</b>	<b>Fed/State Regulation</b>	<b>Comments</b>
	performance over temperature range (batteries used in flashlights, radios, and other electronics)	Hg banned in alkaline batteries in 1996	MN, WI MN	
<b>Mercuric Oxide Batteries (also button cell, mercury-zinc button cell)</b>	Mercury used as cathode material and is integral component (button cell batteries contain ~40% mercury)	Sale of dry cell batteries with mercuric oxide, electrode batteries prohibited without exemption; button cell nonrechargeable batteries restricted to <25mg Hg; labeling requirements; disposal prohibited; manufacturers responsible for collection system	MN	Primarily used in hearing aids; also used in calculators, watches, cameras, photographic equipment, electronic games, health/hospital equipment, airplane underwater locator beacons
		Hg content of alkaline button cell batteries must be <25 mg by weight	NY	NY is exploring recycling options for these batteries  Some mercuric oxide cells used in military and medical operations (e.g., night vision devices, EKG machines, etc.) are disposed of as hazardous waste. Proposed federal legislation may ban mercuric oxide batteries.
<b>Carbon Zinc (LeClanche)</b>	Contain ~1% Hg; Hg controls chemical reactions between zinc and other battery components	Sale prohibited if Hg concentration >1ppm	NY	Carbon zinc cells have shorter life than alkaline batteries. Mercury is no longer used in certain zinc battery products.
		Sale of batteries with Hg banned after 1994	WI	
<b>Zinc Air</b>	Hg content ~ 1%	Button cells restricted to <25 mg mercury, labeling	MN	Used in pagers, hearing aids



### ***Appendix C: Regulations on Products that Contain Mercury***

*Note: This table highlights regulations that affect the most common mercury-containing products. It is not a comprehensive list of all products that may contain mercury. The "Comments" section includes general information that expands on the regulatory information.*

Product/Use	Role of Mercury	Regulations/Programs on Mercury Products	Fed/State Regulation	Comments
Instruments and Related Products				
Measure and Control Instruments				
Thermometers	Elemental mercury indicates temperature	Limits on distribution of Hg thermometers; mercury must be removed before disposal; no routine distribution of Hg thermometers by medical facilities	MN	Digital thermometers are replacing mercury thermometers
Barometers	Indicates pressure			
Medical, Scientific Instruments	Temperature and pressure measuring devices	Products w/Hg must be labeled, including disposal restrictions	MN	
Dental Equipment and Supplies				
Dental Equipment/Supplies	Forms alloys; chemically binds compounds to form restorative material	FDA regulates dental mercury and amalgam alloys separately as class I and class II devices under Federal Food, Drug, and Cosmetic Act	Federal	One of nation's largest manufacturers of mercury amalgam dental fillings will place warnings on amalgam containers shipped to California and provide warning signs for dental patient waiting rooms under California's Proposition 65 (Safe Drinking Water and Toxic Enforcement Act).
		Disposal banned unless mercury reused, recycled or managed to ensure compliance	MN	
		Purchaser must sign agreement of use for medical or dental uses	MN	The Act requires businesses that use or distribute toxics to label or otherwise notify the public about possible exposure to chemicals.
Discontinued Uses				
embalming fluid	Preservative			
film pack batteries		Use discontinued as of 1988		
maritime paints	Antifouling agent	Registrations suspended in 1972	Federal	
photographic development				
soap				
wood preservatives				

## Appendix D: Examples of State Mercury Controls

*Adapted from the Mercury Study Report to Congress Volume VIII, 1997*

<i>Mercury Sources/targets</i>	<i>States with Controls</i>	<i>Control/action</i>
<b>ENVIRONMENTAL SOURCES</b>		
General	Minnesota	<ul style="list-style-type: none"> <li>State has established goals of reducing total mercury releases, from new and existing sources, into air and water by 60 percent from 1990 levels by 12/31/2000, and by 70 percent from 1990 levels by 12/31/2005.</li> </ul>
	Vermont	<ul style="list-style-type: none"> <li>State has established an advisory committee on mercury pollution.</li> </ul>
Air Point Sources	Florida	<ul style="list-style-type: none"> <li>Mercury emission standard for municipal solid waste incinerators (65 micrograms/m<sup>3</sup>).</li> </ul>
	Minnesota	<ul style="list-style-type: none"> <li>Proposed waste combustion rules include emission limits.</li> <li>New incinerator permits with mercury limits will require air monitoring systems and periodic stack testing.</li> </ul>
	New Jersey	<ul style="list-style-type: none"> <li>Mercury emission standard for municipal solid waste incinerators (65 micrograms/m<sup>3</sup>), with further reductions to be phased in.</li> </ul>
	Ohio	<ul style="list-style-type: none"> <li>Considering installing mercury-emission control equipment.</li> </ul>
	Wisconsin	<ul style="list-style-type: none"> <li>State will prepare and adopt minimum standards for mercury air emissions.</li> <li>Medical waste incinerators with capacity greater than 5 tons per day must be tested for mercury during the first 90 day period of operation and once the following year.</li> </ul>
Water Point Sources	Michigan	<ul style="list-style-type: none"> <li>Businesses must report use and discharge information for mercury under the Water Pollution Control Act.</li> </ul>
	Wisconsin	<ul style="list-style-type: none"> <li>State will adopt maximum discharge limits on mercury and mercury compounds.</li> </ul>
Hg-Containing Wastes	Florida	<ul style="list-style-type: none"> <li>It is illegal for small quantity generators (SQGs) to knowingly place batteries or products containing a mercuric oxide electrode into their solid waste stream. Also, manufacturers and distributors of mercuric oxide batteries are required to implement a take-back program for these batteries and products with non-removable batteries, without regard to brand.</li> <li>The incineration of, or landfill disposal of mercury-containing devices and spent lamps is prohibited.</li> <li>Requires local governments to implement source separation programs at solid waste facilities to remove mercury containing devices.</li> </ul>
	Minnesota	<ul style="list-style-type: none"> <li>Management standards for facilities recycling mercury- containing hazardous wastes (currently being drafted).</li> <li>Mercury must be removed from products before disposal.</li> </ul>
	New Hampshire	<ul style="list-style-type: none"> <li>Established a committee to study mercury source reduction and recycling issues.</li> </ul>
	Vermont	<ul style="list-style-type: none"> <li>Labeled mercury-added consumer products must be separated and disposed of in authorized facilities.</li> <li>All solid waste districts and municipalities must implement public information and mercury-collection programs.</li> <li>State prohibits landfill disposal of labeled mercury-added consumer products.</li> </ul>
	Wisconsin	<ul style="list-style-type: none"> <li>State requires testing and reporting of mercury emissions by operators of Medical Waste Incinerators.</li> </ul>
<b>PRODUCTS</b>		
White Goods	Illinois	<ul style="list-style-type: none"> <li>Mercury components must be removed from discarded white goods before disposal.</li> </ul>
	Minnesota	<ul style="list-style-type: none"> <li>Products containing mercury must be labeled, and the labels must include any disposal restrictions.</li> <li>Mercury components must be removed prior to disposal.</li> <li>The distribution of mercury- containing fever thermometers is restricted.</li> <li>Manufacturers must provide information and incentives regarding recycling or proper management.</li> <li>HVAC dealers are required to properly manage or recycle used mercury thermostats.</li> <li>Mercury in repaired or replaced items must be recycled.</li> </ul>
Batteries	Arkansas	<ul style="list-style-type: none"> <li>Ban on the manufacture of alkaline batteries containing any mercury effective 1- 1- 96.</li> <li>Ban on the manufacture of mercury- containing zinc carbon and mercury button cell batteries effective 1- 1- 94.</li> <li>State issued regulations defining collection procedures and responsibilities of the manufacturer and user of</li> </ul>

## Appendix D: Examples of State Mercury Controls

*Adapted from the Mercury Study Report to Congress Volume VIII, 1997*

<i>Mercury Sources/targets</i>	<i>States with Controls</i>	<i>Control/action</i>
		mercury batteries effective 1- 1- 94.
	California	<ul style="list-style-type: none"> <li>• Required manufacturer to reduce the level of mercury to 0.025% by weight in alkaline batteries effective 1- 1- 94, and ban on the manufacture of alkaline batteries containing any mercury effective 1- 1- 96.</li> <li>• Ban on the manufacture of mercury- containing zinc carbon and mercury button cell batteries effective 1- 1- 94.</li> </ul>
	Connecticut	<ul style="list-style-type: none"> <li>• Required manufacturer to reduce the level of mercury to 0.025% by weight in alkaline batteries effective 1- 1- 92.</li> <li>• Ban on the manufacture of mercury- containing zinc carbon batteries effective 1- 1- 93.</li> <li>• Collection of mercury button cell batteries required by retailer effective 1- 1- 92.</li> <li>• State issued regulations defining responsibilities of manufacturer, supplier and user effective 1- 1- 92.</li> </ul>
	Florida	<ul style="list-style-type: none"> <li>• Ban on the sale of alkaline batteries containing mercury greater than 0.025% by weight effective 7- 1- 95, and ban on the retail sale of alkaline and zinc carbon batteries containing any mercury effective 1- 1- 96.</li> <li>• Ban on the sale of mercury button cell batteries effective 10- 1- 93.</li> <li>• State issued regulations defining collection procedures and responsibilities of the manufacturer and user of mercury batteries effective 1- 1- 94.</li> <li>• Ban on the sale of mercury containing batteries if manufacturer fails to meet collection procedures and other responsibilities effective 1- 1- 94.</li> </ul>
	Illinois	<ul style="list-style-type: none"> <li>• Task force to study storage, transport, disposal and recycling.</li> </ul>
	Iowa	<ul style="list-style-type: none"> <li>• Ban on the sale of alkaline batteries containing mercury greater than 0.025% by weight effective 7- 1- 93, and ban on the retail sale of alkaline batteries containing any mercury effective 1- 1- 96.</li> <li>• State issued regulations defining responsibilities of manufacturer, supplier and user effective 7- 1- 96.</li> <li>• Ban on the sale of mercury- containing batteries (including button cells) if manufacturer fails to meet collection procedures and other responsibilities effective 7- 1- 96.</li> <li>• Collection of mercury button cell batteries required by retailer effective 7- 1- 96.</li> </ul>
	Maine	<ul style="list-style-type: none"> <li>• Ban on the sale of alkaline batteries containing mercury greater than 0.025% by weight effective 1- 1- 94, and ban on the manufacture of alkaline batteries containing any mercury effective 1- 1- 96.</li> <li>• Ban on the sale of mercury containing zinc carbon batteries and mercury button cell batteries effective 1- 1- 93.</li> <li>• State issued regulations defining collection procedures and responsibilities of the manufacturer and user of mercury batteries effective 1- 1- 94.</li> </ul>
	Maryland	<ul style="list-style-type: none"> <li>• Collection of mercury button cell batteries required by retailer effective 7- 1- 94.</li> <li>• Ban on the sale of mercury button cell batteries if manufacturer fails to meet collection, transportation, disposal and consumer education responsibilities effective 7- 1- 94.</li> <li>• General ban on the sale of mercury containing batteries effective 7- 1- 94, but state authorized to grant exemptions if certain requirements are met.</li> <li>• State issued regulations defining responsibilities of manufacturer, supplier and user effective 7- 1- 94.</li> </ul>
	Massachusetts	<ul style="list-style-type: none"> <li>• Ban on the retail sale of mercury- containing alkaline batteries effective 1- 1- 95 is pending.</li> <li>• State regulations defining collection procedures and responsibilities of the manufacturer and user of mercury batteries are pending.</li> <li>• Ban on the sale of mercury button cell batteries is pending.</li> </ul>
	Michigan	<ul style="list-style-type: none"> <li>• A new battery law signed on June 29, 1995.</li> <li>• This law bans the sale of alkaline batteries containing mercury (with the exception of alkaline manganese button cells containing less than 25 mg of mercury) and zinc carbon batteries containing mercury beginning January 1, 1996.</li> </ul>

## Appendix D: Examples of State Mercury Controls

*Adapted from the Mercury Study Report to Congress Volume VIII, 1997*

<i>Mercury Sources/targets</i>	<i>States with Controls</i>	<i>Control/action</i>
		<ul style="list-style-type: none"> <li>The sale of mercuric oxide batteries (with the exception of button cells) are also banned for sale after January 1, 1996, unless the manufacturer identifies a collection site for recycling, informs users of the locations and informs the purchasers of a telephone number that can be called to get information about returning mercuric oxide batteries for recycling or proper disposal.</li> </ul>
	Minnesota	<ul style="list-style-type: none"> <li>Required manufacturer to sell alkaline batteries containing no more than 0.025% mercury by weight effective 2- 1- 92, and has banned manufacturer sale of alkaline batteries containing any mercury effective 1- 1- 96.</li> <li>General ban on the sale of mercury- containing batteries effective 2- 1- 92, but state authorized to grant exemptions if certain requirements are met.</li> <li>Mercury batteries may not contain more than 25 mg of mercury unless an exemption is granted.</li> <li>Sale of dry cell batteries with mercuric oxide and electrode batteries prohibited without exemption.</li> <li>Ban on mercury button cell batteries effective 2- 1- 92.</li> <li>Manufacturers must set up collection, transport, recycling and consumer education programs.</li> </ul>
	New Hampshire	<ul style="list-style-type: none"> <li>Required manufacturer to reduce the level of mercury in alkaline batteries to 0.025% by weight effective 1- 1- 93, and has banned the manufacturer sale of alkaline batteries containing any mercury effective 1- 1- 96.</li> <li>Ban on the manufacture of mercury- containing zinc carbon batteries effective 1- 1- 93.</li> <li>State issued regulations defining collection procedures and responsibilities of the manufacturer and user of mercury batteries effective 1- 1- 93.</li> <li>State issued regulations regarding the collection of mercury button cell batteries effective 1- 1- 93.</li> </ul>
	New Jersey	<ul style="list-style-type: none"> <li>Required manufacturer to reduce the level of mercury to 0.025% by weight in alkaline batteries effective 1- 1- 92, and ban on the manufacture of alkaline batteries containing any mercury effective 1- 1- 96.</li> <li>Ban on the manufacture of mercury- containing zinc carbon batteries effective 1- 1- 92.</li> <li>Ban on mercury button cell batteries effective 1- 1- 94.</li> <li>State issued regulations defining collection procedures and responsibilities of the manufacturer and user of mercury batteries effective 1- 20- 93.</li> <li>Sale of mercury batteries banned if manufacturer fails to meet collection and other responsibilities effective 1- 20- 93.</li> </ul>
	New York	<ul style="list-style-type: none"> <li>Required manufacturer to reduce the level of mercury to 0.025% by weight in alkaline batteries effective 1- 1- 92.</li> <li>Ban on the manufacture of mercury- containing zinc carbon batteries effective 1- 1- 93.</li> <li>Mercury oxide battery ban pending.</li> </ul>
	Oregon	<ul style="list-style-type: none"> <li>Required manufacturer to reduce the level of mercury to 0.025% by weight in alkaline batteries effective 1- 1- 92.</li> </ul>
	Rhode Island	<ul style="list-style-type: none"> <li>Required manufacturer to reduce the level of mercury to 0.025% by weight in alkaline batteries effective 1- 1- 92.</li> <li>State issued regulations defining collection procedures and responsibilities of the manufacturer and user of mercury batteries effective 1- 1- 94.</li> <li>Ban on mercury button cell batteries effective 1- 1- 93.</li> </ul>
	Vermont	<ul style="list-style-type: none"> <li>Required manufacturer to reduce the level of mercury in alkaline batteries by 0.025% by weight effective 2- 1- 92, and ban on the retail sale of alkaline batteries containing any mercury effective 1- 1- 96.</li> <li>Ban on mercury button cell batteries effective 1- 1- 93.</li> <li>State issued regulations defining collection procedures and responsibilities of the manufacturer and user of mercury batteries effective 1- 1- 93.</li> </ul>

## Appendix D: Examples of State Mercury Controls

*Adapted from the Mercury Study Report to Congress Volume VIII, 1997*

<i>Mercury Sources/targets</i>	<i>States with Controls</i>	<i>Control/action</i>
Electrical Components	Wisconsin	<ul style="list-style-type: none"> <li>Batteries sold to the public containing mercury must be labeled, other than button batteries.</li> <li>Ban on the manufacture of mercury- containing alkaline batteries effective 1- 1- 96, and ban on the manufacture of mercury- containing zinc carbon batteries effective 7- 1- 94.</li> <li>State issued regulations defining collection procedures and responsibilities of the manufacturer and user of mercury batteries effective 7- 1- 94.</li> <li>Ban on the manufacture of mercury- containing batteries if manufacturer fails to meet collection procedures and other responsibilities effective 7- 1- 94.</li> </ul>
	Minnesota	<ul style="list-style-type: none"> <li>Switches, electric relays, or other electrical devices individually or as part of another product, that contain mercury, must be labeled, and the labels must include any disposal restrictions.</li> </ul>
	Pennsylvania	<ul style="list-style-type: none"> <li>Mercury use in mining equipment (i.e., electrical machinery) is limited.</li> </ul>
	Vermont	<ul style="list-style-type: none"> <li>Requires labeling of switches, electric relays, or other electrical devices individually or as part of another product, that contain mercury.</li> </ul>
Paints and Pigments	Minnesota	<ul style="list-style-type: none"> <li>No mercury can be deliberately introduced into products intended for use in Minnesota, except for art supplies.</li> </ul>
Medical and Dental Uses	Minnesota	<ul style="list-style-type: none"> <li>Disposal of dental equipment and supplies containing mercury is banned, unless the mercury is reused, recycled, or managed to ensure compliance.</li> <li>Purchaser must sign an agreement of use for medical or dental uses.</li> <li>Ban on the use of mercury manometers.</li> </ul>
	New Jersey New Hampshire	<ul style="list-style-type: none"> <li>Prohibits sale or use of embalming fluids containing mercury.</li> </ul>
	Vermont	<ul style="list-style-type: none"> <li>Products containing mercury must be labeled.</li> </ul>
Toys	Michigan	<ul style="list-style-type: none"> <li>No sale of toys containing mercury (pending).</li> </ul>
	Minnesota Wisconsin	<ul style="list-style-type: none"> <li>Toys with mercury are banned and fines are imposed on retail sales of toys containing mercury.</li> </ul>
Laboratory Uses	Michigan	<ul style="list-style-type: none"> <li>Mercury will be banned in school labs by the year 2000.</li> </ul>
Lighting	Florida	<ul style="list-style-type: none"> <li>Ban on incineration of lamps. Crushing, landfilling and recycling of lamps allowed with appropriate controls (proposed).</li> <li>Florida also will control management of residual mercury from recycling operations.</li> </ul>
	Minnesota	<ul style="list-style-type: none"> <li>Fluorescent lamps and high intensity lamps sold to managers of industrial, commercial, office, or multi-unit buildings must be labeled and building contractors must specify mercury management plans for removed lamps.</li> <li>Lamps in state- owned buildings must be recycled.</li> <li>Mercury must be removed from mercury vapor lights before disposal and lamp sellers and contractors must provide public education about mercury management requirements.</li> <li>The production and distribution of mercury vapor lights are limited.</li> </ul>
	New York	<ul style="list-style-type: none"> <li>Mercury vapor lights must be self- extinguishing or have protective shield.</li> </ul>
	Ohio	<ul style="list-style-type: none"> <li>Lamps are viewed as by- products that can be recycled, and exempt from RCRA.</li> </ul>
	Vermont	<ul style="list-style-type: none"> <li>Lamps containing mercury must be labeled.</li> </ul>
	Ohio	<ul style="list-style-type: none"> <li>The sale of mercury and mercury compounds is restricted.</li> </ul>
Poisons	Pennsylvania	<ul style="list-style-type: none"> <li>Levels established for mercury products considered to be safe.</li> </ul>
Packaging	Florida New Jersey	<ul style="list-style-type: none"> <li>State bans the sale of, and restricts the use of packaging and packaging components containing mercury.</li> </ul>

## Appendix D: Examples of State Mercury Controls

*Adapted from the Mercury Study Report to Congress Volume VIII, 1997*

<i>Mercury Sources/targets</i>	<i>States with Controls</i>	<i>Control/action</i>
	Illinois Minnesota New York Wisconsin	<ul style="list-style-type: none"> <li>Restrictions on mercury content in packaging are being phased in. (Dates and concentrations vary by state).</li> </ul>
Pharmaceuticals	Michigan	<ul style="list-style-type: none"> <li>Labeling of livestock remedies containing mercury is required.</li> </ul>
	Illinois Indiana New York Ohio Pennsylvania	<ul style="list-style-type: none"> <li>Manufacturers must list the quantity of mercury in products.</li> </ul>
Explosives/Fireworks	Michigan New Jersey	<ul style="list-style-type: none"> <li>The sale or use of fireworks containing mercury is prohibited.</li> </ul>
	Minnesota Wisconsin	<ul style="list-style-type: none"> <li>Explosives containing mercury are Class A maximum hazards.</li> <li>Permits required for fireworks with mercury (Minnesota only).</li> </ul>
Thermostats and Thermometers	Minnesota	<ul style="list-style-type: none"> <li>Manufacturers of thermostats containing mercury must label such items and provide incentives for, and information to, purchasers and consumers to ensure the mercury disposal is properly managed. Otherwise, the manufacturer is liable for improper disposal of such thermostats by purchasers and consumers.</li> <li>Medical facilities may not routinely distribute thermometers containing mercury.</li> </ul>
	Vermont	<ul style="list-style-type: none"> <li>Products containing mercury must be labeled.</li> </ul>
Automobiles	Minnesota	<ul style="list-style-type: none"> <li>Crushing of automobiles is prohibited unless a good faith effort has been made to remove all mercury switches.</li> </ul>

## Appendix E: Federal Mercury Controls

*Adapted from OECD, 1995*

<i>Specific Sources/focus</i>	<i>Control/action</i>
<b>ENVIRONMENTAL MEDIA</b>	
Drinking Water	<ul style="list-style-type: none"> <li>Maximum contaminant level (MCL) = 0.002 mg/ L (40 CFR 141.62, 21 CFR 103.35).</li> </ul>
Surface Water	<ul style="list-style-type: none"> <li>Ambient Water Quality Criteria; water and organisms = 0.012 µg/ L (40 CFR 401, 403, Appendix B).</li> <li>Water Quality Guidance for the Great Lakes System: aquatic life = 1.44 µg/ L (acute) and 0.77 µg/ L (chronic); human health = 0.0018 µg/ L; wildlife = 0.0013 µg/ L (40 CFR 132).</li> </ul>
Air	<ul style="list-style-type: none"> <li>No ambient air standard.</li> </ul>
Soil	<ul style="list-style-type: none"> <li>No soil standard.</li> </ul>
<b>ENVIRONMENTAL SOURCES</b>	
Air Point Sources	<ul style="list-style-type: none"> <li>Emissions from mercury ore processing facilities and mercury cell chlor- alkali plants are limited to a maximum of 2,300 g/ 24 hours (40 CFR 61.01).</li> <li>Emissions from sludge incineration plants, sludge drying plants, or a combination of these that process wastewater treatment plant sludges are limited to a maximum of 3,200 g/ 24 hours (40 CFR 61.52).</li> <li>Industrial sources emitting mercury and mercury compounds may be subject to Maximum Achievable Control Technology (MACT) standards for major stationary sources and Generally Available Control Technology (GACT) standards for area sources<sup>1b</sup>.</li> <li>Emission guidelines on mercury emissions from municipal waste combustors under §§ 111 and 129 of the 1990 Clean Air Act Amendments.</li> <li>Regulations on mercury emissions from medical waste incinerators under §§ 111 and 129 of the 1990 Clean Air Act Amendments were promulgated on August 15, 1997.</li> <li>Airborne emissions of mercury on and other substances from the burning of hazardous waste in boilers and industrial furnaces, including cement kilns, are regulated under the Resource Conservation and Recovery Act (40 CFR 266).</li> </ul>
Water Point Sources	<ul style="list-style-type: none"> <li>Effluents from industrial facilities and municipal wastewater treatment facilities are regulated through industry- specific pretreatment standards and effluent guidelines for existing and new sources of pollution and are based on the limits of the available control technology (40 CFR 401, 403, Appendix B).</li> <li>Groundwater at hazardous waste treatment, storage and disposal facilities must be monitored for the presence of mercury (40 CFR 302.4, 264.94).</li> </ul>
Sewage Sludge	<ul style="list-style-type: none"> <li>Permissible levels of mercury in municipal wastewater treatment sludges: 17 mg/ kg dry wt. and cumulative load of 17 kg/ hectare for agricultural land; 17 mg/ kg dry wt. and annual load of 0.85 kg/ hectare for home garden or lawn; 57 mg/ kg dry wt. for other land applications; and 100 kg/ hectare for surface disposal (CWA).</li> </ul>
Mercury-Containing Wastes	<ul style="list-style-type: none"> <li>Any solid waste (including soil that is being disposed) is considered a hazardous substance and prohibited from disposal in RCRA Subtitle D (non- hazardous) landfills if its leachate contains 0.2 mg/ L mercury or greater (40 CFR 261.24); land disposal in RCRA Subtitle C (hazardous) landfills is allowed only after prescribed treatment to reduce mercury in extract to 0.2 mg/ L (40 CFR 268).</li> <li>Certain wastes are listed as hazardous due, at least in part, to the presence of mercury (e. g., K071 = brine purification muds from the mercury cell process in chlorine production, and K106 = wastewater treatment sludge from the mercury cell process in chlorine production).</li> <li>The amount of mercury in a number of hazardous wastewaters (e. g., F039, K071, K106, P065, P092) must be treated down to specified levels to meet the land disposal restrictions.</li> </ul>

<sup>1</sup> Under the 1990 Clean Air Act Amendments, mercury and mercury compounds are regulated as hazardous air pollutants (HAPs). MACT standards will apply to major stationary sources emitting more than 10 ton/yr of mercury or any other one HAP, or 25 ton/yr of any combination of HAPs.

## Appendix E: Federal Mercury Controls

*Adapted from OECD, 1995*

<i>Specific Sources/focus</i>	<i>Control/action</i>
Any Environmental Release	<ul style="list-style-type: none"> <li>Any release of 1 pound or more of mercury into the environment in a 24- hour period (the reportable quantity) must be reported immediately to the National Response Center if the release is not federally permitted (40 CFR 302).</li> <li>Certain facilities that release more than a reportable quantity of mercury must immediately report the release to state and local entities.</li> <li>Any release or transfer of mercury by facilities that exceed use or manufacturing thresholds is reportable under the Toxic Release Inventory.</li> </ul>
Foodstuffs or Feed	<ul style="list-style-type: none"> <li>Action level for methylmercury in fish, shellfish and other aquatic animals = 1 ppm (FDA CPG 7180.07).</li> <li>The import of foods containing the residue of mercury- containing pesticides that are not registered for use in the U. S. is prohibited.</li> </ul>
<b>PRODUCTS</b>	
Batteries	<ul style="list-style-type: none"> <li>By early 1991, all U. S. manufacturers converted production so that the mercury content of batteries, except in button and coin cells, did not exceed 0.025% by weight.</li> <li>Federal legislation pending concerning the manufacture of only "non- mercury" formula batteries of all types by 1- 1- 97.</li> <li>Federal ban on mercury button cell batteries pending as of 1- 1- 95.</li> <li>Federal legislation permitting only the manufacture of "no mercury" formula zinc carbon batteries pending as of 1- 1- 95.</li> </ul>
Paints and Pigments	<ul style="list-style-type: none"> <li>All uses of mercury in paints have been discontinued.</li> </ul>
Dental Uses	<ul style="list-style-type: none"> <li>Dental mercury is classified as a Class I medical device, with extensive safety regulations on its use. Dental amalgam alloy is classified as a Class II device, subject to additional special controls.</li> <li>U. S. Public Health Service has recently studied risks from mercury amalgams and recommended tighter controls on dental uses of mercury and further research to reach more definitive conclusions on risk.</li> </ul>
Lighting	<ul style="list-style-type: none"> <li>Because many fluorescent lamps are classified as RCRA hazardous wastes under current test procedures, U. S. EPA is evaluating options for lamp disposal. Major options are 1) conditional exclusion of lamps from hazardous waste management requirements, and 2) handling lamps in a special collection system for other "low grade" and small quantity hazardous wastes (such as batteries and household pesticides).</li> </ul>
Pesticides	<ul style="list-style-type: none"> <li>No current production of mercury- containing pesticides; all former registrations have been cancelled or requests for voluntary cancellation have been received.</li> </ul>
Special Paper Coatings	<ul style="list-style-type: none"> <li>The only two companies that manufacture these products have announced that plans are being developed to phase out the use of mercury in the coatings.</li> <li>It is predicted that mercury will be eliminated entirely from this application by 1995.</li> </ul>
Pharmaceuticals	<ul style="list-style-type: none"> <li>Removal or restriction of mercury in "over- the- counter" (OTC) drugs such as anorectal products and topical antiseptics.</li> <li>Request for additional data on other OTC mercury antimicrobials.</li> </ul>
Cosmetics	<ul style="list-style-type: none"> <li>The use of mercury as a preservative or antimicrobial is limited to eye- area cosmetics or ointments in concentrations less than 60ppm (21 CFR 700.13).</li> </ul>
<b>OTHER STANDARDS AND PROGRAMS</b>	
Occupational Standards	<ul style="list-style-type: none"> <li>OSHA Standards: ceiling limit of 0.1 mg/m<sup>3</sup> for inorganic and elemental mercury, 0.01 mg/m<sup>3</sup> as an 8- hr time weighted average for alkylmercury compounds, and a ceiling limit of 0.04 mg/m<sup>3</sup> for alkylmercury compounds<sup>2</sup>.</li> <li>All forms of mercury are assigned a skin notation, indicating that the substance is absorbed through the skin and therefore skin contact should be avoided.</li> <li>As an OSHA hazardous chemical, the presence of mercury at a facility requires submittal of a Material Safety Data Sheet.</li> </ul>

<sup>2</sup>

More stringent standards were recently overturned in U.S. court.



## Appendix E: Federal Mercury Controls

*Adapted from OECD, 1995*

<i>Specific Sources/focus</i>	<i>Control/action</i>
Transportation Standards	<ul style="list-style-type: none"><li>• Designated as hazardous substances by the Department of Transportation and subject to requirements for packaging, shipping and transportation (40 CFR 172.101).</li></ul>
Virtual Elimination Project	<ul style="list-style-type: none"><li>• U. S. EPA and other mercury stakeholders are looking holistically at mercury sources and policies to identify and promote "cleaner, cheaper, smarter" ways of reducing mercury levels in the Great Lakes region.</li><li>• Efforts are designed to (1) reduce uses at the source through pollution prevention measures, (2) reduce releases through treatment or other management techniques and (3) clean up sites of past contamination.</li></ul>

## Appendix F: Voluntary Initiatives

*This table is adapted from U.S. Status Report on Mercury, 1999*

<i>Title</i>	<i>Description</i>
<b>A. Federal Voluntary Partnerships and Initiatives</b>	
	Three northwest Indiana steel mills, Bethlehem Steel Burns Harbor, Ispat Inland Inc. Indiana Harbor Works, and U.S. Steel Gary Works, signed a voluntary agreement with the Lake Michigan Forum, U.S. Environmental Protection Agency (EPA), and the Indiana Department of Environmental Management (IDEM), on September 15, 1998, to reduce the use of mercury at their facilities. The mills intend to develop a clean sweep/pollution prevention initiative to inventory, recycle, and substitute to the greatest extent practicable mercury at their facilities.
	EPA and the American Hospital Association (AHA) signed a memorandum of understanding, on June 25, 1998, committing them to work together to significantly cut hospital wastes by 2005. The agreement envisions the virtual elimination of mercury-containing hospital wastes and a one-third reduction in total hospital wastes by 2005. EPA and AHA intend to co-sponsor a series of national waste management seminars for hospitals. The agreement also covers: obtaining and reviewing industry information on pollution prevention efforts; developing model plans for cutting chemical wastes; and investigating pollution prevention opportunities for ethylene oxide and persistent, bioaccumulative, and toxic pollutants.
	EPA Region 5 recently awarded a matching funds grant to the Ecology Center of Ann Arbor, to promote pollution prevention (P2) in the health care industry in partnership with the Michigan Hospital Association. The project will focus on mercury reduction in SE Michigan. The award was made through the Environmental Justice P2 Grant program competition.
	The Chlorine Institute has provided to USEPA its first annual report detailing the chlor-alkali industry's progress towards meeting a voluntary commitment to reducing mercury use 50 percent by 2005. The report includes descriptions of activities undertaken to help identify reduction opportunities, and also provides data on preliminary reductions achieved in 1996 and 1997. The Chlorine Institute's report can be viewed at: <a href="http://www.epa.gov/bns/bnsmerc.html">http://www.epa.gov/bns/bnsmerc.html</a>
	Olin Corp. has set a goal to eliminate discharges of mercury used to produce chlorine and caustic soda at its two chlor-alkali plants. The company will be involved in a research program designed to answer uncertainties about the quantity of mercury released from these plants. The research will be conducted by the Department of Energy's Oak Ridge National Laboratory, and the Universities of Tennessee and Michigan, and will be funded by Olin Corp., and EPA.
	EPA's Green Lights Program is a voluntary initiative with state and local governments, and industry, that encourages use of high efficiency light fixtures and use of appropriate disposal/ recycling for mercury containing lamps.
<b>B. State Voluntary Partnerships and Initiatives</b>	
	Wisconsin Department of Natural Resources provided information encouraging mercury reduction to state hospitals and clinics in 1998. A booklet, "Mercury-Free: What's In It for Me", was included with the annual medical waste report that hospitals must complete for the state. This outreach effort was the result of interaction and cooperation between two different bureaus within DNR. While hospitals are not required to report on mercury reduction efforts underway, two chose to do so.

## Appendix F: Voluntary Initiatives

*This table is adapted from U.S. Status Report on Mercury, 1999*

<i>Title</i>	<i>Description</i>
	Wisconsin Department of Natural Resources is partnering with electric utilities through the Thermostat Recycling Corporation (TRC), community clean sweeps, household hazardous waste collection facilities, and other means to promote recycling and replacement of mercury-switch thermostats. Two of the state's six major utilities have included promotional materials with customer bills and/or on their web sites. TRC reports that, since November 1997, 932 thermostats have been collected; 69 recycling bins have been issued; and 9.7 pounds of mercury have been reclaimed.
	Beginning in the Fall of 1998, the Wisconsin Department of Natural Resources, the University of Wisconsin, and the University of Wisconsin Extension Program began replacing mercury-containing manometers to Wisconsin farmers in the Great Lakes basin. This program is funded by a grant from the U.S. EPA Great Lakes National Program Office and is patterned after a similar program in Minnesota.
	Indiana's Department of Environmental Management (IDEM) Mercury Awareness Program is a state and local partnership dedicated to investigating and identifying commercial uses of mercury, researching potential pollution prevention options, and developing and implementing outreach strategies for significant sources. In October 1998, IDEM initiated a statewide effort to collect and recycle household items containing mercury. The effort will be led by the Regional Household Hazardous Waste Task Force, a consortium of 35 southern Indiana solid waste management districts, and will involve other solid waste management districts and communities.
	Michigan's Mercury Pollution Prevention (M2P2) Task Force was convened in August 1994 and, since that time has been active in numerous mercury pollution prevention efforts across Michigan. A few of the Task Force's efforts include: <ul style="list-style-type: none"> <li>• Michigan Department of Environmental Quality (MDEQ) has funded a household hazardous waste collection program in 22 counties across Michigan and approximately 200 pounds of mercury have been collected;</li> <li>• M2P2 Task Force's Automobile Subgroup identified 23 uses of mercury in automobiles; and</li> <li>• Outreach materials describing mercury threats and disposal options have been distributed to science teachers.</li> </ul>
	In order to evaluate progress towards the zero discharge goal in the Lake Superior basin, baseline information is needed on indicators of releases of nine designated chemicals. The Minnesota Pollution Control Agency (MPCA) is working on two projects to 1) establish a baseline for five mercury indicators and 2) encourage the use of low mercury feedstock chemicals, such as caustic soda. MPCA is also working with a group of Minnesota stakeholders in the development of a comprehensive mercury reduction strategy. The stakeholders are involved through an advisory council that will provide recommendations to the state government on mercury reduction options. Teams of staff and stakeholders are working on reduction strategies and the criteria by which to rank them. The agency will use the council's advice as one source of information when considering a mercury reduction initiative. The MPCA may develop regulations or recommend legislation as a result.
<b>C. Community-based Voluntary Initiatives</b>	

## Appendix F: Voluntary Initiatives

*This table is adapted from U.S. Status Report on Mercury, 1999*

<i>Title</i>	<i>Description</i>
WLSSD Undertakes Amalgam Recycling Initiative	Western Lake Superior Sanitary District (WLSSD) in cooperation with the Northeast District Dental Society has developed recycling procedures for materials containing amalgam particles. Amalgam contains mercury which, if disposed of in solid or medical waste or rinsed to the sewer, could be released to the environment. The first annual amalgam recycling report showed that approximately 522 pounds of waste material containing amalgam was collected for recycling. Eighty eight percent of dental practices responded to the survey conducted by the WLSSD. The Minnesota Dental Association also supports amalgam recycling.
WLSSD Mercury Zero Discharge Pilot Project	Western Lake Superior Sanitary District (WLSSD), the largest wastewater treatment facility discharging to the Lake Superior watershed, is supporting the goal of zero discharge of persistent bioaccumulative toxics by developing a multimedia mercury zero discharge pilot project with hospitals, clinics, educational institutions, laboratories, and dental practices. WLSSD hopes this program will not only test the theory that prevention at the source is more cost-effective than end-of-pipe treatment, but will also ultimately result in the virtual elimination of mercury discharges from these specific business types. In some instances reduced discharge through recycling, on-site treatment, or better management practices may be an interim goal. The specific activities will include documentation of the sources of mercury for the specific business types.
Blueprint for Mercury Elimination	<p>With support from the Great Lakes Protection Fund, the Western Lake Superior Sanitary District (WLSSD) has conducted a Mercury Zero Discharge Project to identify and eliminate sources of mercury to its wastewater treatment plant. The results of the project have been compiled in a Blueprint for Mercury Elimination, designed for use by other wastewater treatment plants in developing and implementing their own mercury reduction programs. It includes information on sources of mercury, successful reduction strategies and case studies, and suggestions for implementing a program. As a result of this project, WLSSD initiated or strengthened pollution prevention partnerships with industries, educational facilities, hospitals, and dentists in its service area and demonstrated that significant mercury reductions in municipal wastewater discharges can be achieved through cooperative partnerships with industry, public education, and disposal facilities.</p> <p>To date, the Blueprint for Mercury Elimination has been disseminated to over 800 wastewater treatment plants throughout the Great Lake States and Canada. In addition, over 1200 Blueprints have been sent to pretreatment coordinators, government units, environmental agencies and other interested parties throughout the Great Lake States, Canada, and the rest of the United States. The work begun under the Mercury Zero Discharge Project continues with support from the U.S. EPA Great Lakes National Program Office.</p>
Wisconsin Communities Initiate Mercury Reduction Projects	Mercury releases to municipal sanitary sewer systems by hospitals, dental offices, schools, universities, laboratories, other facilities, and homes are largely unregulated. The Wisconsin Department of Natural Resources is working with seven communities to develop and implement mercury reduction programs targeted to these diverse wastewater sources. The programs are designed to educate the population about the impacts of and alternatives to mercury use, collect mercury and mercury products, and provide information about and/or coordinate transporting the mercury to a contractor for recycling.

## Appendix F: Voluntary Initiatives

*This table is adapted from U.S. Status Report on Mercury, 1999*

<i>Title</i>	<i>Description</i>
Pennsylvania Department of Environmental Protection P3ERIE Program	<p>P3ERIE is a voluntary pollution prevention program composed of DEP, businesses, civic organizations, and educational institutions in the greater Erie community. Their mission is "to build support for pollution prevention by developing and implementing a public education campaign and practical projects to reduce the amount of mercury and other persistent toxins that are used and released to the environment in the greater Erie community, especially the Lake Erie watershed." To date, P3ERIE has accomplished the following:</p> <ul style="list-style-type: none"> <li>• collected 1,245 pounds of elemental mercury during a 1998 Earth Day event;</li> <li>• distributed 9,000 brochures regarding mercury pollution prevention;</li> <li>• worked to encourage northwest Pennsylvania's largest hospital, Hamot Medical Center, to become mercury-free;</li> <li>• conducted energy efficiency workshops at the Northwest Pennsylvania Manufacturer's Association; and</li> <li>• implemented an active pollution prevention program for school laboratories.</li> </ul>
Detroit Water and Sewerage Department (DWSD) PCB/Mercury Minimization Program	<p>Consistent with its ongoing efforts to work with its customers to pilot pollution prevention programs, the DWSD has undertaken a number of special programs to effectively control mercury in hospitals, dental practices, industrial laundries, laboratories, and households. DWSD has initiated an Atmospheric Deposition Study, made revisions to its Local Limits Ordinance, and established an Education/Outreach Program for the general public. The program helps identify current uses of mercury, identify and encourage use of mercury-free alternatives, explore ways to reduce mercury use, coordinate and/or encourage proper disposal practices, and evaluate the effectiveness of voluntary activities to date. In one project under this program, the DWSD developed and coordinated a six-month Bulk Mercury Collection Program in cooperation with the Michigan Dental Association, the National Wildlife Federation, the Michigan Department of Environmental Quality, and the U.S. EPA. More than 400 dentists took advantage of the pro</p>
Mercury Reduction Project for the Greater Milwaukee Area	<p>This project is a joint effort of the Pollution Prevention Partnership, Milwaukee Metropolitan Sewerage District, and Wisconsin Department of Natural Resources. The project has already produced a Mercury Source Sector Assessment Report to help identify important "source sectors," to set priorities for developing cooperative mercury education, technical assistance, and collection programs, and to develop an effective mercury reduction program.</p>
<b>D. Industrial/commercial Voluntary Initiatives</b>	
Electric Utility Industry	<p>The amount of coal used by non-utility industry is being reduced through the further electrification of industry throughout the country. Efficient electrical use opportunities are matched and marketed to non-utility coal users to replace coal processes. For example, many efficient electric arc furnaces have replaced basic oxygen furnaces in steel manufacture. The industry estimates that a reduction of more than 15 tons of emitted mercury for commercial and industrial boilers has already resulted.</p>
DTE Energy/Detroit Edison Just-in-Time Arrangements	<p>In response to a 1997 request by the state to reduce storage and eliminate the need for mercury instruments that could be replaced cost-effectively with non-mercury instruments, Detroit Edison, Michigan's largest electric utility, employed just-in-time arrangements for instrumentation and mercury with a supplier. The project will end in December 1998. One ton less mercury is now stored at Detroit Edison facilities.</p>

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*This table is adapted from U.S. Status Report on Mercury, 1999*

<i>Title</i>	<i>Description</i>
Consumers Energy Company Undertakes Mercury P2 Initiative	Consumers Energy Company, a Michigan electrical and gas energy and energy services company, began a Mercury Pollution Prevention Initiative in 1996. Mercury is contained in coal used in fuel and is used in plant equipment. The company took action to identify its mercury sources, estimate the total quantity of mercury use, review existing disposal practices, and investigate future management options and costs. The program has heightened awareness of mercury concerns in the company and presented options for use of non-mercury containing equipment. It has also reduced the use of equipment containing mercury and associated stock inventory. In 1996, the program recorded a 231 pound reduction of elemental liquid mercury; in 1997, an additional reduction of 171 pounds was reported.
Niagara Mohawk Power Corporation	Niagara Mohawk Power Corporation, an investor-owned electric and gas utility providing energy to 1.5 million residential, commercial and industrial customers, is committed to the virtual elimination of the use of mercury in its service territory and has established a goal of replacing all mercury containing gas regulators. Since 1995, the company reportedly has committed considerable resources to the elimination of mercury in its systems. The company reports that it has reduced the number of mercury containing gas regulators from approximately 37,500 to approximately 600. The company also reports that it has achieved the U.S. BNS Challenge for Level I substances and that these results surpass the 50 percent reduction target of the Binational Toxics Strategy in the deliberate use of mercury.
Mercury and PCBs: American Electric Power	Since 1987, AEP has voluntarily removed PCBs from its transmission and distribution equipment, including about 4,000 PCB-filled and mineral oil-filled transformers, 15,000 PCB substation capacitors, and 860 other PCB items. AEP's Project Good Turn encourages customers in Ohio, Indiana, and Michigan to turn in second, older working refrigerators and freezers for recycling CFCs and scrap metal, incinerating PCB capacitors, and safe disposal of mercury. AEP reports that it has already recycled more than 40,000 units containing a total of more than 1,000 pounds of PCBs and 80 pounds of mercury.
Battery Industry	<p>In 1984 and 1985, the battery industry accounted for approximately 55% of the total United States consumption of mercury, according to the U.S. Bureau of Mines. Industry-wide initiatives have been taken to decrease the presence of mercury in batteries and battery related mercury contributions to municipal solid waste. New technologies have been introduced which control gassing (which can lead to leakage and possible ruptures) in batteries without the use of mercury. These technologies include: (1) removing or decreasing impurities which cause gassing; (2) using other formulations to suppress gasses and; (3) redesigning the batteries to allow gases to escape at faster rates.</p> <p>Mercury batteries, which use mercuric oxide as an electrode material, have been replaced by alternatives, such as zinc air batteries, except for a few non-household specialty uses. When alternatives are not available, battery manufacturers provide information so that the battery user can send the used batteries to a properly licensed collection site for recycling or proper disposal.</p> <p>As a result of these initiatives, the battery industry reports that the United States battery industry's 1994 consumption of mercury was 99.41% less than its 1984 consumption rate (29,700 flasks in 1984, one flask = 76 pounds, to 174 flasks in 1994.) During this same time period, annual sales of alkaline batteries in the United States increased 150%.</p>

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*This table is adapted from U.S. Status Report on Mercury, 1999*

<i>Title</i>	<i>Description</i>
Thermostat Recycling Corporation Initiative	In December 1997, the Thermostat Recycling Corporation (TRC) launched a program to recycle mercury-switch thermostats in nine states, including Indiana, Michigan, Minnesota, Ohio, and Wisconsin. The TRC is a private corporation established by thermostat manufacturers, Honeywell, General Electric, and White-Rodgers. Under the program, heating and cooling contractors can drop off old mercury-switch thermostats at participating wholesalers. The wholesalers will collect the thermostats in protective bins provided by TRC and send them to TRC's recycling center where the switches will be removed and forwarded to a mercury recycler. TRC reports that it has processed 50 pounds of mercury in the program's first six months.
Lighting Industry Pushes for Design and Manufacturing Advances	The lighting industry has made significant investments in manufacturing process and new lamp designs to continue to drive down mercury content in lamps. These investments have reportedly reduced the average mercury content of a four foot lamp from 48.2 mg in 1985 to 22.8 mg in 1994. The lamp industry expects to drive mercury content below 12 mg/lamp by the year 2000.
Mercury and PCBs: Consumers Energy Company Launches Replacement Lighting Program	In 1996, Consumers Energy Company launched the "Bottom Line Solutions" replacement lighting program for commercial and industrial customers. The program allows customers to increase their business' lighting while reducing operating and future disposal costs. The new fixtures have efficient, low-mercury lights and non-PCB ballasts.
Mercury and Hexachlorobenzene: The Dow Chemical Company	In support of the Binational Toxics Strategy, The Dow Chemical Company has set a goal for the company to reduce air and water emissions of hexachlorobenzene and mercury compounds by 75 percent by 2005.
Bell Atlantic Mercury Collection Project	Bell Atlantic, a provider of telecommunication services, has instituted a project to collect all mercury relays and switches from old telecommunication equipment. The effort is ongoing with no expected end date. The collected electrical devices are sent to a mercury smelter that safely separates the mercury from the metal casings. On an annual basis, Bell Atlantic collects more than 50,000 pounds of switches and relays containing mercury.

## Appendix F: Voluntary Initiatives

*This table is adapted from U.S. Status Report on Mercury, 1999*

<i>Title</i>	<i>Description</i>
Automobile Pollution Prevention Project	<p>Chrysler Corporation, Ford Motor Company, General Motors Corporation, and the American Automobile Manufacturers Association joined forces in 1991 to form the US Automotive Pollution Prevention Project (or, Auto Project). The project began as a partnership, with the U.S. EPA (Great Lakes National Program Office) funding the Michigan Department of Environmental Quality (DEQ) to launch the project. Now, the auto industry itself is leading the project and making great progress in reducing pollution at the source.</p> <p>The focus of the project is a group of "Great Lakes Persistent Toxic Substances" (GLPTSs), including Mercury and PCBs. After the first four years, the project has expanded from a concentration on the Great Lakes to a national effort. A similar effort was launched in Canada in 1992.</p> <p>An integral part of this ongoing effort is the 70 pollution prevention case studies (not all of which pertain to BNS substances) that have been developed by the auto companies. The case studies are available at: <a href="http://www.deq.state.mi.us/ead/p2sect/auto/">http://www.deq.state.mi.us/ead/p2sect/auto/</a> The American Automobile Manufacturers Association will track emissions of both Binational Toxic Strategy Level I and Level II substances through the U.S. Auto Pollution Prevention Project. EPA Region 5 remains strongly involved through the Auto Project Advisory Group (APAG) which also includes representatives from trade associations, higher education, technology centers, public interest groups, a foundation, and state governments.</p>
General Motors Corporation	Using environmentally conscious design and manufacturing principles, General Motors Midsize & Luxury Car Group (MLCG) facilities replaced mercury switches with ball-type switches used in underhood lamp activation in their 1998 Cadillac and Buick models. The company reports that this change resulted in an estimated elimination of 1,500 pounds of mercury a year from underhood switches. It has been estimated that the mercury contained in underhood and trunk lamp switches accounts for 87% of mercury usage in automotive applications. This amounts to 12.2 million mercury switches containing a total of 8.5 metric tons of mercury per year. MLCG has already eliminated all mercury switches in the trunk lamp activation and replaced these with trunk-ajar switches.
Chrysler Corporation	Chrysler Corporation instituted a project to modify product specifications to: eliminate mercury from equipment; decommission mercury-containing equipment; and evaluate the alternative for blood pressure measurement equipment. The project has resulted in mercury being removed from 20 engineering equipment specifications. The company reports that 1000 pounds of decommissioned mercury were collected in the first year. Mercury-free alternatives to sphygmomanometers were also identified.
Chrysler Corporation	Chrysler has participated in discussions with the Michigan Mercury Pollution Prevention Task Force about mercury use within its facilities and products. The company had discovered in 1995 that mercury is used in underhood switches of certain current models. Chrysler has worked with the American Automobile Association to develop a common approach to identify and remove the mercury switches.
Ford Motor Company	Ford Motor Company reports that it has worked since 1995 to identify feasible alternatives for all mercury switches in all models worldwide and to introduce mercury-free designs in all identified applications as soon as practicable.
<b>E. Special Interest Initiatives</b>	
Mercury Information Sheet	Greenpeace Native Lands Campaign and the Indigenous Environmental Network collaborate on several environmental issues. Together, they have produced an information sheet on mercury contamination, its sources and effects.



## **Appendix F: Voluntary Initiatives**

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<i>Title</i>	<i>Description</i>
Community Mercury Reduction Project	As part of the Lake Superior Alliance Sustainable Basin Project, the Central Upper Peninsula Sierra Club was awarded a grant to develop a Community Mercury Reduction Project. Through this grant, the Marquette Community Mercury Reduction Task Force was formed. The Task Force developed recommendations related to: sampling; public education; outreach; ordinances; small businesses; and its own continued efforts. In June 1998, the Marquette Area Wastewater Treatment Facility submitted a grant to EPA Region 5 requesting support to implement the Task Force's efforts to achieve a regional mercury mass balance, continue education and outreach, and implement community mercury reduction activities. The project is designed to be transferrable to other communities in the Great Lakes .
Binational Strategy, Generally: National Wildlife Federation	The National Wildlife Federation (NWF) has promoted the reduction and virtual elimination of Binational Toxics Strategy substances for several years. NWF utilizes a broad range of activities and tools such as hosting workshops, convening special task forces, distributing action alerts and publishing reports and articles on timely topics to educate the public regarding important water quality issues. NWF is working with EPA and state officials to promote the establishment of total maximum daily loads (TMDL) for mercury in regional watersheds.